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metco

Material Product Data Sheet
Hydroxyapatite Powders

Powder Products:
Metco 6902A, Metco 6903A

1 Introduction

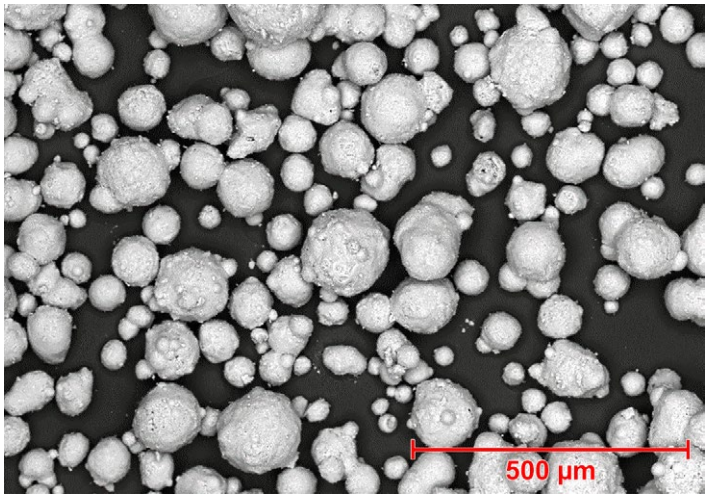
Oerlikon Metco's hydroxyapatite powders produce coatings having a range of characteristics not found in any other thermal spray powder materials. The coatings are biocompatible and bioactive with high bond strength and resistant to most corrosives. Owing to these suitable chemical and mechanical properties, hydroxyapatite powder can be employed in a number of applications via powder metallurgy and thermal spray processes.

Thermal spray coatings of hydroxyapatite are commonly used in medical applications where biologic compatibility is required. They are often used either as a top coat over a porous titanium bond coat or directly coated onto an implant substrate surface. Hydroxyapatite coatings are bioactive and known to accelerate the osseointegration process. The coatings are produced under controlled atmosphere conditions (low pressure or soft vacuum) and used in orthopedic, dental and maxillofacial applications.

1.1 Typical Uses and Applications:

- Biomedical applications (coatings on prosthetic implants)
- Nutraceutical

Quick Facts	
Classification	Ceramic, hydroxyapatite
Synonyms	■ Hydroxylapatite ■ HAP ■ Calcium Phosphate Hydroxide ■ Calcium Hydrophosphate ■ Decalcium Hexaphosphate Dihydroxide ■ Calcium Phosphate Tribasic
Chemical Formula	98 %+ $Ca_5(PO_4)_3OH$ [a.k.a. $Ca_{10}(PO_4)_6(OH)_2$ or $HCa_5O_{13}P_3$]
Molecular Weight	502.31 g/mol
Decomposition Temp.	1400 °C (2552 °F)
Ca/P Molar Ratio	1.66 to 1.71
Melting Point	1100 °C (2012 °F)
Manufacture	Chemical (Precipitation) and Agglomeration or Hydrothermal Reaction (Calcination) and Agglomeration
Morphology	Spheroidal
Color	White to Off-White
Purpose	Biocompatibility
Process	Atmospheric plasma spray or ChamPro™ (VPS or CAPS)



SEM of Metco 6902A showing outer morphology

2 Material Information

2.1 Chemical Composition

Product	$Ca_5(PO_4)_3OH$ (wt. %)	As (mg/kg)	Cd (mg/kg)	Hg (mg/kg)	Pb (mg/kg)	Total Heavy Metals (wt. %)	α-TCP (wt. %)	β-TCP (wt. %)	TTCP (wt. %)	CaO (wt. %)
Metco 6902A	Balance	< 3	< 5	< 5	< 30	< 30	< 0.5	< 0.5	< 0.5	< 0.5
Metco 6903A	Balance	< 3	< 5	< 5	< 30	< 30	< 0.5	< 0.5	< 0.5	< 0.5

2.2 Particle Size Distribution, Grade and Other Properties

Product	Nominal Particle Size Distribution		ASTM Grade	Manufacturing Method	Morphology	Formerly Known As
Metco 6902A	-150 +38 µm	(-100 +400 mesh)	Medical	Calcination + Agglomeration	Spheroidal	Metco 6902
Metco 6903A	-63 +16 µm	(-230 mesh +16 µm)	Medical	Precipitation + Agglomeration	Spheroidal	XPT-D-703

Upper particle size via sieve analysis in accordance with ASTM B214; lower particle size analysis via laser diffraction (Microtrac).

2.3 Key Selection Criteria

- Metco 6902A can be applied directly onto the substrate without a bond coat and produces a thick, rough, porous coating with a thickness of 20 to 200 µm (785 to 7900 µin).
- Use Metco 6903A can be applied directly onto the substrate without a bond coat or over a bond coat of porous titanium (alloy) to produce a thin, porous coating with a thickness of 40 to 100 µm (1575 to 3950 µin).

2.4 Related Products

- Oerlikon Metco supplies a number of pure titanium and titanium alloy (Ti 6Al 4V) powders in grades suitable for biomedical applications. Please see Data Sheet DSMTS-0089 for more information or contact your Oerlikon Metco sales representative.

2.5 Recommended Spray Processes

Product	Atmospheric Plasma Spray	ChamPro (VPS or CAPS)
Metco 6902A	✓	✓
Metco 6903A	✓	✓

2.6 Customer Specifications

Product	Customer Specifications
Metco 6902A	ASTM F1185 ISO 13779
Metco 6903A	ASTM F1185 ISO 13779

3 Coating Information

3.1 Key Thermal Spray Coating Information

Application in the atmosphere or under vacuum conditions is recommended to avoid potential hazardous conditions and to prevent excessive fuming that can have an undesirable effect on the coating microstructure or performance. properties.

3.2 Coating Parameters

Please contact your Oerlikon Metco Account Representative for parameter availability. For specific coating application requirements, the services of Oerlikon Metco's Coating Solution Centers are available.

Recommended Spray Guns	
Atmospheric Plasma	**ChamPro**
TriplexPro series	SinplexPro O3C
SinplexPro series	

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 6902A	1069865	1 kg (approx. 2.2 lb)	Stock	Global
Metco 6903A	1000017	1 kg (approx. 2.2 lb)	Stock	Global

4.2 Handling Recommendations

- Store in the original container in a dry location.
- Tumble contents gently prior to use to prevent segregation.
- Open containers should be stored in a drying oven to prevent moisture pickup.

4.3 Safety Recommendations

See The SDS 50-787 (Safety Data Sheet) in the localized version applicable to the product and the country where the material will be used. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

www.oerlikon.com/metco
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